

C L A I M S

1. A method of assembling tyres for vehicle wheels, comprising the steps of:

- 5 - arranging on a primary drum (15), a carcass structure (3) comprising at least one carcass ply (10) in engagement with annular anchoring structures (7) axially spaced apart from each other;
- disposing a belt structure (4) comprising at least  
10 one belt layer (12a, 12b, 12c), on an auxiliary drum (16);
- picking up the belt structure (4) from the auxiliary drum (16) to transfer it to a position coaxially centred with respect to the carcass structure (3);
- 15 - shaping the carcass structure (3) according to a toroidal configuration for engagement of the belt structure (4) with the carcass structure (3);
- applying a tread band (5) to the belt structure (4) in engagement with the carcass structure (3);
- 20 - applying a pair of sidewalls (6) to the carcass structure (3) on opposite sides thereof;
- wherein at least one of said steps of applying a tread band (5) and applying a pair of sidewalls (6) is carried out by winding up at least one continuous  
25 strip-like element of elastomer material in contiguous circumferential coils around the carcass structure (3).

2. A method as claimed in claim 1, wherein application of the tread band (5) is carried out by winding at  
30 least one first continuous strip-like element of elastomer material, in the form of contiguous circumferential coils, around the belt structure (4).

3. A method as claimed in claim 1, wherein application  
35 of each sidewall (6) is carried out by winding at least

one second continuous strip-like element of elastomer material in contiguous circumferential coils, around the carcass structure (3).

5 4. A method as claimed in claim 1, wherein application of the sidewalls (6) is carried out after the carcass structure (3) has been shaped into a toroidal configuration.

10 5. A method as claimed in claim 1, wherein application of the sidewalls (6) is carried out after application of the tread band (5).

15 6. A method as claimed in claim 1, wherein application of the sidewalls (6) is carried out before application of the tread band (5).

20 7. A method as claimed in claim 1, wherein the continuous strip-like element is fed from a delivery member (19, 19a, 20) placed at a region close to the tyre (2) being processed, simultaneously with winding up of the strip-like element itself around the geometric axis of the carcass structure (3).

25 8. A method as claimed in claim 7, wherein feeding of the continuous strip-like element is carried out by extrusion through said delivery member (19, 19a, 20).

30 9. A method as claimed in claim 7, wherein concurrently with application of the continuous strip-like element, the following steps are carried out:

- giving the primary drum (15) a circumferential-distribution rotatory motion around a geometric rotation axis thereof, so that the continuous strip-like element is circumferentially distributed around

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the geometric axis of the carcass structure (3);

- carrying out controlled relative transverse-distribution displacements between the primary drum (15) and delivery member (19, 19a, 20) so as to form  
5 with said strip-like element a plurality of coils disposed in mutual side by side relationship.

10. A method as claimed in claim 9, wherein said transverse-distribution displacements are carried out  
10 by movement of the primary drum (15).

11. A method as claimed in claim 9, wherein driving in rotation and movement of the primary drum (15) are carried out by an actuating assembly (21a, 21b, 29)  
15 engaging the primary drum itself.

12. A method as claimed in claim 1, wherein after transfer of the belt structure (4) and before carrying out application of the continuous strip-like element,  
20 the step of moving the primary drum (15) towards the delivery member (19, 19a, 20) is carried out, starting from a position at which the primary drum (15) interacts with a transfer member (18) shifting the belt structure (4) onto the carcass structure (3).

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13. A method as claimed in claim 7, further comprising the step of moving the primary drum (15) away from said delivery member (19, 19a, 20) to position it in front of devices for disengaging the tyre (2) from the  
30 primary drum (15).

14. A method as claimed in claim 1, further comprising the step of transferring the primary drum (15) to a region between at least one first delivery member (19, 19a) intended for application of the tread band (5) and  
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at least one second delivery member (20) intended for manufacture of the sidewalls (6).

15. A method as claimed in claim 1, wherein said steps  
5 of arranging the carcass structure (3), shaping the carcass structure (3), applying a tread band (5) and applying a pair of sidewalls (6), are cyclically carried out following a controlled rate on at least one first and one second primary drums (15), the step of  
10 arranging the carcass structure (3) on one of the primary drums (15) being carried out before completing assembling of a tyre on the other of the primary drums (15).

15 16. A method as claimed in claim 1, further comprising the steps of:  
- forming the carcass structure (3) on a building drum (14);  
- transferring the carcass structure (3) from the  
20 building drum (14) to the primary drum (15).

17. A method as claimed in claim 16, wherein transfer of the carcass structure (3) from the building drum (14) to the primary drum (15) is carried out  
25 subsequently to engagement of the belt structure (4) with the carcass structure (3).

18. A method as claimed in claim 16, wherein formation of the carcass structure (3) comprises the step of  
30 associating auxiliary inserts for elastic support (11) with said at least one carcass ply (10), each of said auxiliary inserts showing a radially internal edge (11a) disposed close to one of the annular anchoring structures (7) and a radially external edge (11b)  
35 disposed close to a side edge of the belt structure

(4).

19. A method as claimed in claim 1, further comprising  
at least one rolling step carried out on the belt  
5 structure (4) applied to the carcass structure (3).

20. A method as claimed in claim 1, wherein before at  
least one of said application steps, a step of storing  
carcass structures (3) in engagement with respective  
10 belt structures (4) is carried out.

21. An apparatus for assembling tyres for vehicle  
wheels comprising:

- at least one primary drum (15) arranged to support a  
15 carcass structure (3) comprising at least one carcass  
ply (10) in engagement with anchoring structures (7)  
axially spaced apart from each other;

- an auxiliary drum (16) set to carry a belt structure  
(4);

20 - a transfer member (18) to move the belt structure (4)  
from the auxiliary drum (16) to the carcass structure  
(3);

- at least one unit (19, 19a) for application of a  
tread band (3) onto the belt structure (4);

25 - at least one unit (20) for application of a pair of  
sidewalls (6) against the opposite lateral walls of the  
carcass structure (3);

wherein at least one of said tread band (5) and  
sidewall (6) application units comprises at least one  
30 delivery member (19, 19a, 20) to lay down at least one  
continuous strip-like element of elastomer material in  
contiguous circumferential coils on said carcass  
structure (3).

35 22. An apparatus as claimed in claim 21, wherein said

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delivery member (19, 19a, 20) comprises at least one extruder.

23. An apparatus as claimed in claim 21, wherein  
5 associated with said at least one delivery member (19, 19a, 20) is at least one actuating assembly (21a, 21b, 29) set to drive the primary drum (15) in rotation around a geometric axis thereof, so that said strip-like element is circumferentially distributed on the  
10 belt structure (4), and to cause controlled relative displacements between the primary drum (15) and said at least one delivery member (19, 19a, 20) for  
distribution of said strip-like element so as to form said coils disposed in mutual side by side  
15 relationship.

24. An apparatus as claimed in claim 23, wherein said actuating assembly (21a, 21b, 29) operates on the primary drum (15) to move it relative to the delivery  
20 member (19, 19a, 20).

25. An apparatus as claimed in claim 24, wherein said actuating assembly (21a, 21b) is integrated into a robotized arm engaging the primary drum (15).

26. An apparatus as claimed in claim 24, wherein the actuating assembly (29) comprises a carriage movable along a guide structure (30) between a first position at which it supports the primary drum (15) at a  
30 location in front of application devices (13) of the carcass structure (3), and a second position at which it supports the primary drum (15) at a location in front of said at least one delivery member (19, 19a, 20).

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27. An apparatus as claimed in claim 23, further comprising devices (13) for application of the carcass structure (3) on the primary drum (15), wherein said actuating assembly (21a, 21b, 29) is arranged to cause  
5 translation of the primary drum (15) towards said at least one delivery member (19, 19a, 20) starting from a position at which the primary drum (15) interacts with the devices (13) for application of the carcass structure (3).

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28. An apparatus as claimed in claim 21, comprising at least one first delivery member (19, 19a) designed to form the tread band (5), and at least one second delivery member (20) designed to form the sidewalls  
15 (6).

29. An apparatus as claimed in claim 21, comprising at least one first and one second primary drums (15) engaged by a first and a second actuating assemblies  
20 (21a, 21b) respectively, to be sequentially led to interact with said devices for application of the carcass structure (3), with the unit for application of the tread band (5) and the unit for application of the sidewalls (6).

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30. An apparatus as claimed in claim 21, further comprising:

- a building station (13) for formation of the carcass structure (3) on a building drum (14);
- 30 - transfer devices (31, 33) to transfer the carcass structure (3) from the building drum (14) to said at least one primary drum (15).

31. An apparatus as claimed in claim 30, wherein said  
35 transfer devices comprise a storage magazine (31) and

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an auxiliary transfer member (33) to transfer the carcass structure (3) from the building drum (14) to the storage magazine (31).

5 32. An apparatus as claimed in claim 21, comprising devices for associating auxiliary elastic-support inserts with said at least one carcass ply (10), each of said auxiliary inserts having a radially internal edge (11a) disposed close to one of the annular  
10 anchoring structures (7) and a radially external edge (11b) disposed close to a side edge of the belt structure (4).

33. An apparatus as claimed in claim 21, wherein said  
15 transfer member (18) moves the belt structure (4) from the auxiliary drum (16) to said carcass structure (3) disposed on the primary drum (15).